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The USENIX Association Newsletter

Volume 14, Number 4

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THE PROFESSIONAL AND TECHNICAL
UNIX® ASSOCIATION

NOTICE

:login: is the official newsletter of the USENIX Association, and is sent free of charge to all members of the Association.

The USENIX Association is a not-for-profit organization of those interested in UNIX and UNIX-like systems. It is dedicated to fostering and communicating the development of research and technological information and ideas pertaining to advanced computing systems, to the monitoring and encouragement of continuing innovation in advanced computing environments, and to the provision of a forum where technical issues are aired and critical thought exercised so that its members can remain current and vital.

The officers of the Association are:

President	Alan G. Nemeth <i>agn@usenix.org</i>
Vice-President	Deborah K. Scherrer <i>scherrer@usenix.org</i>
Secretary	Rob Kolstad <i>kolstad@usenix.org</i>
Treasurer	Stephen C. Johnson <i>scj@usenix.org</i>
Directors	M. Kirk McKusick <i>mckusick@usenix.org</i> Sharon Murrel <i>eowyn@usenix.org</i> Michael D. O'Dell <i>mo@usenix.org</i> John S. Quarterman <i>jsq@usenix.org</i>
Executive Director	Ellie Young <i>ellie@usenix.org</i>

USENIX Association Office
2560 Ninth Street, Suite 215
Berkeley, CA 94710
(415) 528-8649
office@usenix.org

The editorial staff of *:login:* is:

Editor & Publisher	Ellie Young
Copy Editor	Michelle Dominijanni
Production Editor	Tom Strong

Judith F. DesHarnais Conference Coordinator

USENIX Conference Office
22672 Lambert Street, Suite 613
El Toro, CA 92630
(714) 588-8649
judy@usenix.org

John L. Donnelly Tutorial & Exhibit Manager

USENIX Exhibit Office
5398 Manhattan Circle
Boulder, CO 80303
(303) 499-2600
johnd@usenix.org

Contributions Solicited

Members of the UNIX community are encouraged to contribute articles to *:login:*. Contributions may be sent electronically to *login@usenix.org* or through the U.S. mail to the Association office. The USENIX Association reserves the right to edit submitted material.

:login: is produced on UNIX systems using *troff* and a variation of the -me macros. Contributions should be in *n/troff* input format, using any macro package.

UUNET Subscriptions

UUNET Communications
3110 Fairview Park Drive, Suite 570
Falls Church, VA 22042
(703) 876-5050
uunet-request@uunet.uu.net

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The Association uses a SUN[†] 3/180S running SUN OS for support of office and membership functions, preparation of *:login:*, and other Association activities. Connected to the SUN is a QMS Lasergrafix^{*} 800 Printer System donated by Quality Micro Systems of Mobile, Alabama. It is used for general printing and draft production of *:login:* and *Computing Systems* with *ditroff* software provided by mt Xinu. The membership and mailing lists are maintained using Sybase.[#]

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Call for Papers

Winter 1990 USENIX Conference

January 22-26, 1990

Omni Shoreham

Washington, DC

Papers are sought in all areas of UNIX-related research and development for the technical program of the 1990 Winter USENIX Conference. Papers which are accepted for the conference will be published in the conference proceedings and shall be presented during the three days of technical sessions at the conference.

Appropriate topics for presentation include, but are not limited to:

New Tools and "Little Languages"
UNIX and AI:
 Intelligent Systems
 Neural Nets
Ada and UNIX –
 Real Experience and Future Expectations
File Systems and Servers
 Failsafe and Failsoft File Managers
 Hierarchical File Migration
 Version Control
Architectures and Compilers
Software Release Systems and Servers
Documentation issues
Distributed Systems and Services
Networking and Security
User Interfaces and
 User Interface Management Systems
Experiences and Novel Applications

All submissions will be considered – however, papers detailing new and interesting work will be regarded much more favorably than thinly disguised product announcements or re-runs of previous reports. The Winter 1990 conference is requiring that **extended abstracts** (and *not* full papers, as in previous conferences) be submitted. An extended abstract should describe the nature of the work, summary of results and conclusions, and should be between 1000-2000 words long (two to three typeset pages). Time is scheduled for authors of accepted papers to complete their

submissions; therefore, extended abstracts will only be accepted when it is felt that a complete and worthy paper can be produced by the final due date.

The final paper should include a 100-300 word abstract, a discussion of how the paper relates to other work, illustrative figures (where appropriate), and citations to relevant literature. Only previously unpublished submissions will be considered. Final papers should contain on the order of 8-12 pages of single spaced typeset materials. All final papers must be submitted in a camera-ready format or electronic format (*troff -ms* if possible) – typewritten or dot-matrix output is **not** acceptable as final output. For authors without access to a laser printer or typesetter, appropriate facilities will be provided by the program chair.

Please submit abstracts as soon as possible, and mail one hard-copy and one electronic-copy to the addresses below. The final deadline for receipt of submissions is **August 14, 1989**; abstracts received after this deadline will not be considered. Notification of acceptance or rejection will be made by **September 25, 1989**. Final camera-ready papers are due by **November 17, 1989**.

To submit a paper or request additional information, please contact:

Daniel V. Klein
Washington USENIX Technical Program
Software Engineering Institute
Carnegie Mellon University
Pittsburgh, PA 15213
+1 (412) 268-7791 (work)
+1 (412) 422-0285 (home)
+1 (412) 268-5758 (FAX)
wash-usenix@sei.cmu.edu
uunet!sei.cmu.edu!wash-usenix

Large Installation Systems Administration III Workshop and Tutorial Program

September 6-8, 1989, Marriott Hotel, Austin, TX

In light of two successful workshops on Large Installation Systems, there is a demonstrable benefit in bringing together system administrators of sites with 100 or more users (on one or more processors) to compare notes on solutions to a variety of common problems.

Tutorials – Wednesday, September 6

A two-track tutorial program will be offered in conjunction with the workshop. Attendees will be able to change between tracks at each topic change. The tutorial notes will include material from both tracks. The tutorials will be presented by Rob Kolstad of Prisma, Inc., and Evi Nemeth and Trent Hein of the University of Colorado.

Joint discussion of ethics, privacy, and security in centralized and distributed systems	
Management policies	Internet networking
Security	NFS/YP
Large scale backups	UUCP
Machine Room Organization	NeWS
Performance	sendmail
User ID management	System upgrades/local documentation
Joint wrap-up discussion: Public Domain Software, Miscellaneous Topics	

Tentative Technical Program

Thursday, September 7

Introductory Remarks	Alix Vasilatos, Program Chair
Keynote Address	
Networked Heterogeneous Systems I	Paul Graham, Chair
Accounting	Bjorn Satdeva, Chair
Network Administration	Kevin Smallwood, Chair
Birds of a Feather Sessions	

Friday, September 8

Networked Heterogeneous Systems II	Bjorn Satdeva, Chair
Panel: Distributed Services	
Work in Progress	Paul Graham, Chair
Security	Alix Vasilatos, Chair
Backup	Kevin Smallwood, Chair

The registration fees are \$225 for the tutorial and \$200 for the technical sessions. You may register for only the tutorial class, only the technical sessions, or both. The registration deadline is **August 30, 1989**. For registration and hotel information, please call the USENIX Conference Office at (714) 588-8649.

Workshop on Experiences with Distributed and Multiprocessor Systems[†]

October 5-6, 1989, Marriott Hotel, Ft. Lauderdale, FL

The goal of this workshop is to bring together individuals who have built, are building, or will soon build distributed and multiprocessor systems, especially operating systems. The workshop will feature full presentations and work-in-progress presentations on aspects of building and using these systems. The workshop will provide a forum for individuals to exchange information on their experiences, both good and bad, in designing, building, and testing their systems. This includes experiences with coding aids, languages, distributed debugging tools, prototyping, reuse of existing software, performance analysis, and lessons learned from use of such systems.

Tentative Schedule

Thursday, Oct. 5

8:30 **Opening remarks.** George Leach, Workshop Chair

8:45 **Session I: Objects and Virtual Memory**

A Distributed Implementation of the Shared Data-Object Model by Henri E. Bal, M. Frans Kaashoek and Andrew S. Tanenbaum (Vrije Universiteit, Amsterdam)

An Implementation of Distributed Shared Memory by Umakishore Ramachandran and M. Yousef A. Khalidi (Georgia Institute of Technology, Atlanta)

An Object-Oriented Implementation of Distributed Virtual Memory by Gary M. Johnston and R. H. Campbell (University of Illinois at Urbana-Champaign)

10:45 **Session II: Process Control**

Experience with Process Migration in Sprite by Fred Douglos (University of California, Berkeley)

Dynamic Server Squads in Yackos by Debra Hensgen and Raphael Finkel (University of Kentucky, Lexington)

Fine-Grain Scheduling by Henry Massalin and Calton Pu (Columbia University, New York)

1:30 **Session III: Performance Considerations**

The Parallelization of Mach/4.3BSD: Design Philosophy and Performance Analysis by Joseph Boykin and Alan Langerman (Encore Computer Corporation, Marlborough)

Efficient Implementation of Modularity in RAID by Charles Koelbel, Fady Lamaa, and Bharat Bhargava (Purdue University, West Lafayette)

Making libc Suitable for use by Parallel Programs by Julie Kucera (Convex Computer Corporation, Richardson)

3:30 **Session IV: Concepts**

Revolution 89 -or- Distributing UNIX Brings it Back to its Original Virtues by Francois Armand, Michel Gien, Frederic Herrmann, and Marc Rozier (Chorus Systems, En Yvelines)

[†] Sponsored by the USENIX Association and the Software Engineering Research Center (SERC), in cooperation with ACM SIGOPS and ACM SIGSOFT, and with the IEEE-CS TC on OS and IEEE-CS TC on Distributed Systems.

A Network File System Supporting Stashing by Luis L. Cova, Rafael Alonso, and Daniel Barbara (Princeton University)

4:20 Work-in-Progress presentations.

Friday, Oct. 6

8:30 **Session V: Multiprocessors**

TUMULT-64: a real-time multi-processor system by Pierre G. Jansen and Gerard J. M. Smit (University of Twente, Enschede)

Experiences with a Family of Multiprocessor Real-Time Operating Systems by Prabha Gopinath and Thomas Bihari (Philips Laboratories, Briarcliff Manor)

Implementation Issues for the Psyche Multiprocessor Operating System by Michael L. Scott, Thomas J. LeBlanc, and Brian D. Marsh (University of Rochester)

10:30 **Session VI: Tools**

Experience with P/Mothra: A Tool for Mutation Based Testing on A Hypercube by ByoungJu Choi and Aditya P. Mathur (Purdue University, West Lafayette)

Debugging and Performance Monitoring in HPC/VORX by Howard P. Katseff (AT&T Bell Laboratories, Holmdel)

CAPS – A Coding Aid used with the PASM Parallel Processing System by James E. Lumpp, Jr., Samuel A. Fineberg, Wayne G. Nation, Thomas L. Casavant, Edward C. Bronson, Howard J. Siegel, Perre H. Pero, Thomas Schwederski, and Dan C. Marinescu (Purdue University, West Lafayette)

The Implementation of Aide: A Support Environment for Distributed Object-Oriented Systems by Rodger Lea and Johnathan Walpole (University of Lancaster, Bailrigg)

1:30 **Session VI: Object-oriented Construction**

Experience With Implementing and Using An Object-Oriented, Distributed System by D. Decouchant, M. Riveill, C. Horn, and E. Finn (Bull-IMAG, Gieres)

Prototyping a distributed object-oriented OS on UNIX by Marc Shapiro (INRIA, Le Chesnay)

Clouds: Experiences in Building an Object Based Distributed Operating System by Umakishore Ramachandran, Sathis Menon, Richard J. LeBlanc, M. Yousef A. Khalidi, Phillip W. Hutto, Partha Dasgupta, Jose M. Bernabeu-Auban, William F. Appelbe, and Mustaque Ahamed (Georgia Institute of Technology, Atlanta)

3:30 **Session VII: Communications, Heterogeneous Systems, and the A-word**

Experiences with Efficient Interprocess Communication in Dune by Marc F. Pucci and James Alberi (Bell Communications Research, Morristown)

Using Transputer Networks to Accelerate Communication Protocols by Horst Schaaser (Hewlett-Packard Laboratories, Bristol)

ARCADE: A Platform for Heterogeneous Distributed Operating Systems by David L. Cohn, William P. Delaney, and Karen M. Tracey (University of Notre Dame)

A Decentralized Real-Time Operating System Supporting Distributed Execution of Ada Tasks by Roger K. Shults (Rockwell International-Collins Divisions, Cedar Rapids)

For information on registration, contact the USENIX Conference Office.

5th USENIX Computer Graphics Workshop

November 16-17, 1989, Doubletree Hotel, Monterey, CA

The theme of the 5th USENIX Computer Graphics Workshop is "personal graphics." By this, we mean the use of computer graphics to aid, benefit, or amuse a single person. Generally, personal graphics applications are highly interactive, so that the user has a great deal of control over the result. Furthermore, the graphics is frequently not an end product, but is instead a communication medium between the user and computer. Examples of personal graphics might include desktop publishing, data visualization programs (e.g., MacSpin), windowing systems, micro-world simulations (Kay's vivarium?), and "performance" graphics (e.g., video weirdness). It

probably does not include ray-tracing, yet another VLSI graphics chip, or fast rendering algorithms. A distinguishing feature is that the user is included as an integral part of the description of the system. One question that may be addressed by presentations in this workshop is "How are 'ordinary people' going to effectively use computer graphics in their daily lives?"

A program will be available in August. The workshop chair is Spencer W. Thomas, EECS Department, University of Michigan.

For information on registration, contact the USENIX Conference Office.

Preliminary Call for Participation

USENIX C++ '90

Tentatively in late-April 1990 in California

C++ continues to show explosive growth as the object oriented implementation language of choice for production level work. The nearly-annual C++ conference is a haven for those who use the language, those who develop the language, and those who are interested in the language. The conference enables them to take a look at where C++ has been, where is it now, and where future developments should take it.

The conference will consist of a day of tutorials and classes and two days of technical sessions. Papers are invited on all aspects of C++, from the development of compilers and preprocessors to case studies of projects which have used the language. Proposals for tutorials or classes on systems which make use of C++ or on the uses of C++ are also invited.

Paper abstracts and tutorial proposals are due January 12, 1990. Abstracts should be no

more than two pages, and should describe the work in sufficient detail to allow the referees to judge the merit of the work. Tutorial proposals should be no more than four pages in length, and should describe the content, purpose, and intended audience. Abstracts and tutorial proposals should be submitted either electronically (preferred) or in hardcopy; electronic submissions should be either plain text, *n/troff*, or Postscript. Notification of acceptance will be made by February 2, 1990; final papers in camera ready form must be received by March 9, 1990. Accepted papers which meet this deadline will be published in a conference proceedings.

Abstracts and proposals should be sent to:

Jim Waldo waldo@apollo.com
Apollo Computer decvax!apollo!waldo
330 Billerica Road
Chelmsford, MA 01826

EUUG Autumn '89 Conference and Exhibition

**September 18-22 1989
Vienna, Austria**

The Autumn 1989 European UNIX systems User Group Technical Conference will include technical tutorials on Monday and Tuesday, followed by a three day conference and exhibition. Subject areas of the technical program will include such topics as security, fault tolerance, transaction processing, RISC architectures, and user interfaces.

For more information on the conference and tutorial program, please contact:

The Secretariat	Tel: +44 763 73039
EUUG	FAX: +44 763 73255
Owles Hall	
Buntingford Herts, SG9 9PL, UK	Email: euug@inset.uucp

Call for Papers EUUG Spring '90 Conference

**April 23-27, 1990
Munich, West Germany**

The EUUG invites papers from those wishing to present their work. Full papers or extended abstracts must be submitted. Suggested subject areas include, but are not limited to:

- Standards for UNIX Systems
- Internationalisation
- Object Oriented Development Tools
- Object Oriented Graphical Toolkits
- Object Oriented Languages
- Program Generators for Commercial Applications
- Network Administration
- Security Issues and Authentication Techniques
- Document Context Architectures

Submission deadline: November 15, 1989
Acceptance notification: December 15, 1989
Final paper: February 10, 1990

Full papers or extended abstracts must be submitted by post to the EUUG Secretariat (address above), and, if possible, in electronic form to *euug-munic@cwi.nl*. Notification of acceptance will be acknowledged by return post.

Call for Papers Convention UNIX 90 March 26-30, 1990, Paris, France

Convention UNIX 90, organized by the French Association of UNIX Users (AFUU) and the Bureau International de Relations Publiques, will have parallel technical, user, and product conferences, and an exhibition and tutorials.

The technical conference will cover a wide range of technical topics. The user conference will stress users experiences, analyses, and strategies in dealing with UNIX. The product conference will have exhibitor presentations concerning existing or future products. Submissions are invited for each of the conferences.

Submissions should include a title, author(s) and affiliation(s), a mention of the

conference for which the submission is offered, and a one page abstract. Abstracts must be received by **Oct. 15, 1989**. Notification of papers selected will be made by **Dec. 1, 1989**. Full papers are due by **Jan. 31, 1990**.

Submissions should be made to:

A.F.U.U.
Attn: Secrétariat de la Conférence
Convention UNIX 90
11, Rue Carnot
94270 Le Kremlin-Bicetre
France
(+33) (1) 46.70.95.90
afuuconf@inria.inria.fr

Baltimore Terminal Room

Many of you who were at the Baltimore USENIX Conference used the Terminal Room located in the Hyatt Hotel. The statistics from the Xylogics Terminal Server showed an average of 1,100,000 bytes received and 930,000 bytes sent per hour of operation across the Internet SLIP link. Approximately 400 local and toll free number calls were made from the room during the week, and at least 87 Sun cartridge tapes of GNU software were made.

I would like to thank Telebit, Xylogics, AT&T, and OSF for providing equipment and funds; Judy DesHarnais, Mike Ballard, Cerafin Castillo, John Loverso, Van Jacobson, Len Tower, Edgar Merke, Evi Nemeth, Ed Gould, and Trent Hein for their assistance in getting the room organized; and all the volunteers who worked long hours so that the conference attendees would not miss any urgent information at their home sites.

Sonya Neufer
Terminal Room Coordinator

And the winners are!

Attendees at the USENIX Baltimore Exhibition who registered at the Apple Computer and/or IBM Corporation booths were eligible to win a computer.

The winner of the Apple Macintosh IIx system and four application software packages was Peter Lega from Digital Equipment Corporation. Richard Karpinski from the University of California, San Francisco, won the fully configured IBM/RT Model 135.

Informal Programming Chair

The Association would like to thank Alix Vasilatos for being the Informal Programming Chair at Baltimore. For the Winter 1990 Conference, Sonya Neufer has been appointed. In addition to her responsibilities as terminal room coordinator, Sonya will coordinate such activities as the opening night reception, orientation session, some BOFs, and overseeing the many other functions that are not part of the technical program.

Long-Term Calendar of UNIX Events[†]

1989 Sep 6-8	* Large Systems Admin. Workshop	Austin Marriott, Austin, TX
1989 Sep 12-13	MALNIX	Kuala Lampur, Malaysia
1989 Sep 18-22	EUUG	Vienna, Austria
1989 Sep 19-22	ACM SIGCOMM	Austin, TX
1989 Sep 25-29	GUUG	Wiesbaden, Germany
1989 Sep 27-29	Workstation Operating Systems	Pacific Grove, CA
1989 Oct 5-6	* Distributed Systems Workshop	Marriott Marina, Ft. Lauderdale, FL
1989 Oct 16-20	IEEE 1003	Brussels, Belgium
1989 Nov 1-3	UNIX Expo	Javits Conv. Ctr., New York, NY
1989 Nov 6-10	DECUS	Anaheim, CA
1989 Nov 9	NLUUG	The Netherlands
1989 Nov 9-10	14th JUS UNIX Symposium	Osaka, Japan
1989 Nov 16-17	* Graphics Workshop V	DoubleTree Hotel, Monterey, CA
1989 Nov 24	AFUU	Paris, France
1989 Dec 5-6	JUS UNIX Fair 89	Tokyo, Japan
1989 Dec 8-9	Sinix	Singapore
1990 Jan	UNIX in Government	Ottawa, Ont.
1990 Jan 22-26	USENIX	Omni Shoreham, Washington, DC
1990 Jan 23-26	UniForum	Washington Hilton, Washington, DC
1990 Jan 29	IEEE 1003	New Orleans, LA
1990 Mar 26-30	AFUU	Paris, France
1990 Spring	* C++ Conference	California
1990 Apr	IEEE 1003	Montreal, Que.
1990 Apr 23-27	EUUG	Munich, Germany
1990 May	UNIX 8x/etc	/usr/group/cdn; Toronto, Ont.
1990 May 7-11	DECUS	New Orleans, LA
1990 Jun 11-15	USENIX	Marriott Hotel, Anaheim, CA
1990 Sep 11-14	AUUG Conference	Southern Cross, Melbourne, Australia
1990 Oct 22-26	EUUG	Nice, France
1991 Jan 21-25	USENIX	Grand Kempinski, Dallas, TX
1991 Jan 22-25	UniForum	Infomart, Dallas, TX
1991 Feb	UNIX in Government	Ottawa, Ont.
1991 May	UNIX 8x/etc	/usr/group/cdn; Toronto, Ont.
1991 May 20-24	EUUG	Tromso, Norway
1991 Jun 10-14	USENIX	Opryland, Nashville, TN
1991 Sep 16-20	EUUG	Hungary
1992 Jan 20-24	USENIX	Hilton Square, San Francisco, CA
1992 Jan 21-24	UniForum	Moscone Center, San Francisco, CA
1992 Spring	EUUG	Jersey, UK
1992 Jun 8-12	USENIX	Marriott, San Antonio, TX
1993 Jan	USENIX	Town & Country, San Diego, CA
1993 Mar 2-4	UniForum	Washington, DC
1993 Jun 21-25	USENIX	Cincinnati, OH

[†] Partly plagiarized from John S. Quarterman of TIC and Alain Williams of EUUG by EY.

* USENIX Workshops

New Conference Sessions

USENIX gatherings have grown from a small group of people exchanging tricks of the trade to conferences of over 2000 attending two days of tutorials and three days of refereed papers. The interests of attendees have expanded to encompass networking, system administration, programming languages and development environments, text processing, windowing systems, user interfaces, and turn-key applications. Over the years, USENIX has adapted to this expansion by adding BOFs, tutorials, a vendor exhibit, workshops, published proceedings, and the journal. What's next?

During the Women's BOF at the San Diego USENIX conference, a suggestion was made to augment the existing conference format to help bring people of matching skills and interests together. Beginning with its Winter '90 conference, USENIX will introduce experimental parallel sessions to provide new and complementary forums of technical excellence. Attendees will be free to migrate between these new sessions and the traditional sessions at will. Suggestions for new sessions include:

- the informal exchange of information on current practical problems, resulting battle scars and solutions
- "short courses" about specific tools and tricks
- panel sessions providing experienced volunteers to answer questions
- survey talks to broaden the expertise of members

Lori Grob and Eric Allman have volunteered to do the initial organization of the new sessions at Washington and at the following

Summer conference in Anaheim. The early plans are modest: five free "short courses" spanning the three conference days, including:

- Andrew Hume on make and regular expressions.
- Eric Allman on C Style/Portability.
- John Quarterman will discuss survival in a global network.
- The traditional meta-talk on submitting and presenting papers will be moved into this series.

Other possibilities include talks on introduction to parallel programming, on submitting and diagnosing problem reports, and on fundamental principles in UNIX.

These new sessions are planned for before and after lunch on Wednesday and Thursday, and before lunch on Friday. The final schedule will be included in the regular conference mailing.

We fully expect this new session to evolve and hope to be guided by discussions at the upcoming sessions and continual feedback from members. If the new sessions succeed, we may continue them as an annual event. Please send any and all comments and contributions regarding possible speakers,* topics, and formats to

newsession@usenix.org

Please don't bother us with offers of vendor presentations.

Sharon Murrel
Eric Allman
Lori Grob
Ellie Young

* Like all speakers in the technical program, these will get free registration only.

The FaceSaver Project

The USENIX FaceSaver Project reappeared at the Summer Conference in Baltimore. This time it was set up in the vendor exhibit area, which gave us the room, power and cooling necessary to run a comfortable operation. In just three days we collected over 900 portraits, which have been sent to *uunet*. These have been added to, or replace some of the 2222 portraits already on file, bringing the total of "unique" faces to 2957. They are available via automatic mail request or via ftp. In addition to names and E-mail addresses, most of these portraits may contain phone numbers, companies and street addresses as supplied by the attendees.



Kathryn Johnson & Craig Schwartz

I want to thank the USENIX Association for sponsoring and funding this project, Rick Adams and UUNET Communications Services, Inc. for providing over 82 Mb of on-line storage for the pictures as a service to the community, the QMS Corporation of Mobile, AL for providing a laser printer, and Bell Technologies (now a division of the Intel Corporation) of Fremont, CA for providing their 80386 System V Release 3 system. The latter two enabled us to run two portrait stations in parallel.

We were all very pleased that Craig Schwartz was our photographer again; he was assisted by Kathryn Johnson. I am grateful to Vincent Cawley and Mary Salus for cheerfully staffing the data terminals and dealing with the release forms, and to B. Edward R., Sir Peter Langston, Dan Klein, Ken Arnold, Paul Kooros and Reidar Bornholdt for their generous help. I also want to thank John Donnelly and Judy

DesHarnais for taking care of the arrangements with the convention center and hotel.

As in the past, attendees could have their pictures taken and/or retaken at no charge. The care taken by Craig and Kathryn in getting attractive portraits clearly justified the extra time they spent with each person. Some of the faces were transferred via cartridge tape to the show network file server during the conference



Mary W. Salus



Vincent Cawley



Lou Katz

Saver of Lost Faces

and were brought up on workstations at the Sun® booth; the serial interface board in the network file server wedged every time we tried to *uucp* the pictures over, preventing full database transfer during the show.

I have deposited a revised C program for printing individual pictures, and a C program with an associated PostScript program for generating a page of labels from the portrait data with *uunet*, for all to use and enjoy.

:login: 14:4

Information on accessing the faces from *uunet*:

Welcome to faceserver, a system for distribution of faces by electronic mail and other means. This text is the reply you'll get to:

```
mail uunet!faceserver <EOF  
help  
EOF
```

To examine the full index for all the faces send a request of the form:

```
send full-index
```

You may include several requests in a single piece of mail, but put each on a separate line. Faces are usually stored by their electronic mail addresses: e.g. *rick@uunet.uu.net* would be stored as *uunet.uu.net/rick*. To get it, you would send the command:

```
send uunet.uu.net/rick
```

uucp sites are stored in a domainish format: e.g. *usenix/lou* would be stored as *usenix.uucp/lou*. So, to get it, you would send the command:

```
send usenix.uucp/lou
```

Those faces that do not have an email address associated with them are stored in the directory *no-email-address* by their first_lastname. e.g.:

```
send no-email-address/p_s_langston
```

(see the full-index for the actual names). The format of the files is described in the file format. To get it send:

```
send format
```

To request programs send the command:

```
echo send index from programs | mail uunet!faceserver
```

To get a specific program:

```
echo send WHATEVER from programs | mail uunet!faceserver
```

Send the requests to "uunet!faceserver" even though replies appear to be coming from "uunet!faceserverd". You'll be talking to a program, so don't expect it to understand much English.

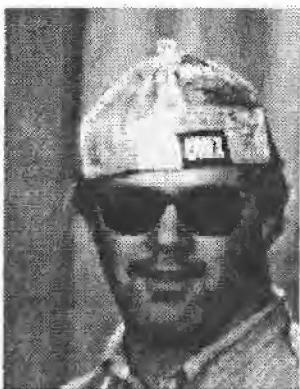
A picture file contains some or all of these information lines:

```
FirstName: Random J.  
LastName: Attendee  
E-mail: rja@nullsys.uucp  
Telephone:1 800 555 1212  
Company: Computers R Us  
Address1: 1234 Fifth Street  
Address2: MS 275W-137N  
CityStateZip: Gotham, UX 99999-0000  
Date: Jun 12, 1989  
PicData: (Actual data) width - height - bits/pixel  
Image: (Should be transformed to) width - height - bits/pixel  
(Blank line)  
Hexified picture in scanline order.
```



Separated at Birth?

Selected “Faces” from Baltimore



USENIX Weanie



So Tired



Abominable Hackerman



Dogs of USENIX



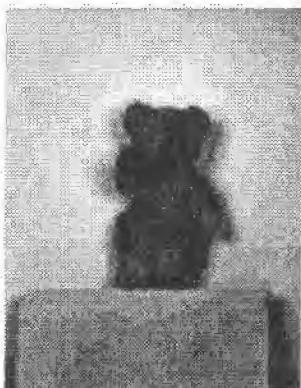
Baghwan Bagman



CyberPink Barry



Fido



Henry



Beanheads of USENIX

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```
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```
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```

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Book Review

Xlib Programming Manual (Volume One)

by Adrian Nye

(O'Reilly and Associates, Inc.) 611 pages

Xlib Reference Manual (Volume Two)

(O'Reilly and Associates, Inc.) 700 pages

Reviewed by Marc Donner

donner@ibm.com

According to all the X gurus I know, one should never need to read or use books like these two. One is supposed to write X applications using a toolkit (any of a number, including Xt from MIT, Xaw from CMU, and others) and never descend to the level of the X libraries. If this is the case, who might be customers for these two books? Toolkit writers are the first who come to mind. Book reviewers come second. In a more serious vein, I suspect that the X application programmer will not feel secure unless he (or she) has a copy of the contents of these two books at hand.

The material in these books should be substantially the same as that in the Xlib documentation that comes with X11R3. I looked at a printed copy of the release documentation to see what might make me want to spend money for thirteen hundred pages of documentation, when I could print fewer than three hundred on my local printer.

The book is up-to-date on several minor matters of detail. For example, all atom names are now prefixed with `XA_` and the books reflect this, though the free documentation does not. I looked in the `Xatoms.h` file to see which was correct and it was the book. The man-page-like entries were adapted almost verbatim from the distribution, up to and including sentences ending with prepositions.

On the other hand, the description included with each man page is much more detailed in the book and shows evidence of having been written by someone with a good understanding of English. Several improvements to the free man pages include reference to appropriate sections of volume one in the description, itemization of the error returns, and a listing of related functions.

Volume one is full of friendly descriptive text about how things work and some things to watch out for, but it seems to be pitched a little too low. The cross referencing is rich, though it isn't always clear that it is relevant. The exposition in volume one is based about some examples. The one pain is that the code is not easily available in machine-readable form. Perhaps it will make it to some future release of X11, but for now it isn't possible to play with the code without typing it in or sending \$10 for a diskette.

The great strength of volume two is the large quantity of cross referencing provided by the various appendices. Each appendix tries to organize some part of the vast X name space according to one principle. The first appendix provides groups of related functions. The third appendix does the same thing with macros. The fifth appendix provides a man page for each event, while the sixth appendix details all the data structures. The only extra thing I'd have asked for here is a cross reference to the appropriate header file for most of the things named here (and in the man pages as well). Finding things in the X directories is always an adventure, even when you know their names.

All in all, the books are well executed and moderately well written. The content seems complete and about as free of obvious errors as X11 itself. The books are primarily aimed at application programmers, even though the X community is urging everyone to use toolkits instead of writing on top of the library directly. I suspect that until a lot more work is finished it will be necessary for application programmers to use the library interface from time to time, so these books will be useful to them.

White Paper on System Administration for IEEE 1003.7

Susanne W. Smith

Windsound Consulting

John S. Quarterman

USENIX Association

ABSTRACT: The new POSIX committee on System Administration, IEEE 1003.7, is attempting to standardize an area in which there is little prior art, and no generally accepted solutions to many of the known problems. It is a large area, and one that intersects with other areas such as networking (IEEE 1003.8) and application programming (IEEE 1003.2). Some of the most applicable prior art was not designed for operating system administration, but for network administration. Perhaps most importantly, there are two basic models for system administration. One must be chosen from the outset, and the choice will affect everything the committee does.

The USENIX Association has coordinated the production of this White Paper to set forth the basic issues the committee must address, to recommend certain choices it will have to make, and to outline some of the existing solutions that must be considered.

1. Introduction

The role of the system administrator has evolved over the years. Where once an administrator was responsible for a single machine or machines from a single vendor there is now often a network of machines from different vendors. Both the homogeneous single machine case and the heterogeneous networked case must be addressed by the system administration committee in producing a standard. This paper offers a description of system administration, its component tasks, and its scope; it recommends a model upon which to build the standard; it presents an overview of some current system administration practices; and it provides a reference list.

2. The Basic Model

The most basic choice for a system administration standard is between a single machine model and a model based on a network of machines.

2.1 A Single Machine

The results of 1003.7 will be applied to many machines that are not connected to any other machines, except perhaps by some

indirect technique such as UUCP. The standard must be applicable to such machines. For this purpose, it need only specify a command interface and detail what the commands are supposed to accomplish.

However, there is a problem with basing the standard on a single machine as a model, because such a standard will not adapt well to a network of machines. The traditional methods used for administration of a single machine are not readily extended for a networked environment. For example maintaining user information on a single machine requires modifications to the */etc/passwd* file. In a networked environment this further requires maintaining the consistency of this file across many machines.

2.2 A Network of Machines

The number of machines connected to networks and the number of networks of computers have grown exponentially in the last several years. Many of us are accustomed to interacting with hundreds of computers on a local area network that is in turn connected to hundreds of thousands of other computers through wide area networks.

2.2.1 Remote Access

Many machines do not even have local disks: files are kept on a central server, which is accessed over the network. There may be more than one server, and two machines may even act as servers for each other for different parts of their file system trees.

2.2.2 Distribution

Databases may not have a single location. The mapping between login names and login IDs may be distributed among several machines. The whole database may be duplicated for redundancy. Parts of it may be kept in different places, for local control. A tree structure may be used.

2.2.3 Heterogeneity

Networked environments tend to have machines with many different hardware types and many different variants of operating systems. One machine may have */etc/passwd* and another may use a distributed database. The possible parameters to an operation may differ. Byte orders and word lengths vary.

2.3 Specifications

A single interface specification is not sufficient for a networking model of system administration. Three things are needed:

2.3.1 Interface

A specification of a programming interface is needed for a networked model, just as for a single machine model. Additional commands may be required for a networked model. But the specification of what the commands for the interface do has to be more complex for a networked model.

2.3.2 Database

Because of differences among machines in a heterogeneous network, such as varying byte orders, word lengths, and options supported, a generic specification of the information to be managed is needed. It is not practical to provide specifications for every type of machine and software and translations between them, because the numbers of specifications needed would be very large.

2.3.3 Operations

Given the interface specification of a command, and the database specification of the information it is to affect, a specification is also needed of how to communicate the necessary operation across the network. This should be done in a manner that is not specific to any of the underlying systems, but that can be translated into appropriate actions on any of them.

2.4 Network Management Standards

These issues and this kind of model have been addressed for the purpose of managing networks. It is possible that the work can be adapted and extended for use by 1003.7. Two components, a management station and a management agent, work together to perform network management functions in the following two protocols. The management station monitors and controls network elements. Management agents perform functions requested by the management station on the network element.

2.4.1 CMIP

The Common Management Information Protocol is the emerging ISO standard for network management. It uses a MIB (Management Information Base) and defines operations to be performed on it over a network.

2.4.2 SNMP

The Simple Network Management Protocol is in use now with TCP/IP on NSFNET. It addresses many of the basic network management problems and presents at least preliminary solutions to them. It proves the concept of a MIB with operations to manipulate it over a network.

2.4.3 ASN.1

Abstract Syntax Notation 1 is the ISO standard for encoding of information at the presentation layer of the seven layer ISO networking model. It is similar to Sun's XDR (External Data Representation) or Apollo's NIDL (Network Interface Definition Language) or NDR (Network Data Representation), but is more general than either. "ASN.1 is useful for describing structures in a machine

independent fashion. Additionally, ASN.1 definitions can be written which convey to the human reader the semantics of the objects they define.”²

Both CMIP and SNMP are written in terms of ASN.1.

2.5 Scope

The responsibilities of system administrators vary widely among installations. In some environments the tasks of the system administrator are defined as “anything it takes to keep computing services available for the user community.” This definition could encompass everything from hardware diagnostics to network management. In some situations the system administrator may be responsible for user support and consulting. In other situations the tasks of the system administrator could be rigidly defined to only include password file maintenance and backups. Because there is no commonly-accepted definition of the scope of system administration, the committee needs to define which specific areas are included as the functions of a system administrator. Scope and definitions are also required parts of an IEEE standard. These should be addressed before commands and facilities are defined.

The committee should consider previous work in network management. The OSI model for network management consists of five functional areas: configuration management, performance management, fault management, accounting management, and security management. These functional areas map very well from network management to operating system management.

2.5.1 Configuration Management

Configuration management in the network sense is defined as “detection and control of the state of the network, both the logical and physical configurations of the network.”¹ Configuration management in a system administration context would refer to the management of the information which defines a machine’s functions. Configuration information determines whether a machine is a file server or client, a timesharing service or single user, diskless or diskful. The configuration

data identifies the location of other machines and services.

2.5.2 Performance Management

Performance management could be defined as the collection and analysis of information that determines a machine’s performance. Examples could be disk throughput, service access times, or cpu utilization.

2.5.3 Fault Management

Fault management is “the detection, isolation, and correction of abnormal operations in the network.”¹ For system administration this would be detection of a service’s failure, notification of the user community of failure, and the initiation of a backup service.

2.5.4 Accounting Management

Accounting management would be the management of the information required to determine the cost of using the system. This type of information is traditionally collected in units of disk storage blocks, cpu usage, and connect time.

2.5.5 Security Management

Security management is composed of the functions required to regulate access to system resources. User authentication, server verification, and security logs are functions of security management.

2.6 Recommendations

We strongly recommend the adoption of a network model. We also recommend that the committee focus on the entities to be managed and not the underlying transport protocol.

2.6.1 Specifications

Every command should be specified in terms of an interface, an information database, and operations to be performed over a network. Although the first of these alone would be sufficient in a single machine case, it is not adequate in a networked environment. A network model can be reduced to handle a single machine as a special case, but a single machine model cannot readily be expanded to support a networked environment. This is the main reason that a network model should be adopted instead of a single machine model.

2.6.2 Network Management

The committee should examine the work done to date on SNMP and CMIP, and should follow the progress of the committees that are producing those protocols. The 1003.7 MIB should be written in ASN.1.

3. Prior Art

We present here some examples of areas in which there is prior art that the committee should consider. This is not an exhaustive list of either the areas to be covered or the prior art in a specific area. There are other such areas, and we encourage others to submit proposals to the committee outlining them.

The examples are grouped according to the OSI model described above. Because system administration covers a broader area than network management the categories have been extended. Additional categories may be required to completely include all system administration functions.

3.1 Configuration Management

In addition to the description above, configuration management could include user configuration information. This would include the information required to describe a user and their environment (i.e. the location of their home directory). This area could also include queueing systems.

3.1.1 /etc/passwd

The simplest database of user information is */etc/passwd*. It is a single file which contains information about each user. */etc/passwd* contains a user's login name, user-id, group id, encrypted password, optional full name and additional information, home directory location, and program to be executed upon successful completion of the login process. User information is added, changed, or deleted by using the command *vipw* or one of many available shell scripts and programs. Access to the information is controlled by file permissions.

This scheme works well in a single machine environment. This method requires each machine to have an */etc/passwd* file. As the number of machines on a network and the number of users increases, maintaining the file

entries on each individual machine becomes an overwhelming, if not impossible, task for the system administrator. Different methods have been proposed to handle the task of maintaining an */etc/passwd* file on each machine in a network.

3.1.2 Yellow Pages

Yellow Pages (yp) is a distributed network lookup service. The Yellow Pages provide configuration information for a group of machines called a domain. A machine requesting information is a yp client and the machine providing the information is a yp server.

The information for a particular domain is a set of maps. Commonly the */etc/passwd* and */etc/hosts* files are replaced by yp maps. However, yp is indifferent to the type of data in the maps. A master flat file resides on a master server machine. Updates to the master file are made there. *dbm* is used to transform the flat file into maps. The maps are then propagated to all slave server machines. The number of slave servers is dependent on network size and topology. A single machine may serve more than one domain.

Once yp services are available (i.e. the maps have been made and the server machines configured) routines on the yp client machine must be modified to initiate yp requests rather than reading local files. Yp requests are remote procedure calls to a yp server.

3.1.3 Moira

"The purpose of Moira is to provide a single point of contact for authoritative information about resources and services in a distributed environment."³ Moira is used to store information about users, the location of network services, the information needed to create the configuration files for network servers, as well as other information. Updates to the database are made using an application interface which is based on curses. Validity checks are performed on data to be updated. Access to each object in the database is controlled by an access control list. Statistics are kept about who modified the object last.

Network server configuration files are created from the Moira database and sent

periodically to the appropriate servers. This eliminates the need to modify configuration files on individual machines. The Hesiod (see below) database is also created from the information in the Moira database.

3.1.4 Hesiod

Hesiod provides a read only front end for user information and the location of network services. User information is extracted from the Moira database and formated into ASCII files in BIND-compatible resource record format. Modifications have been made to BIND to accept and process Hesiod type queries.

Hesiod is used by the login process to acquire user information. Note, however, that Hesiod does not authenticate the user. Authentication is performed by Kerberos. Hesiod is also used by *lpr* to retrieve printer information traditionally stored in the */etc/printcap* file.

3.1.5 Berkeley Print Spooling

The Berkeley print spooling system was intended for use with network print services where printers are connected directly to the network or to the serial port of a host machine on the network. The command *lpr* is used to start the printing process. Line printer daemons (*lpd*) run on each machine in the network to control the spool area, queue, printing, and network transfers.

lpr looks up information for the requested printer in the */etc/printcap* file. This file contains information about each printer, such as location, filters needed, header page format, etc. It determines how to print a file from this information.

The *lpc* command provides queue management functions. *lpc* is used to restart and flush queues, abort jobs, and check the status of queues and printers.

3.1.6 MDQS – Multiple Device Queueing System

MDQS provides for local printer support, remote printer support, local and remote batch job scheduling, conversion of troff to device specific format, and sending graphics data to plotters. MDQS consists of a queue management daemon, a general-purpose spooler, a set

of device specific despoiled-data processing slaves, and utilities for setting form types, disabling service, viewing queues, etc.

A queue/device mapping table contains the queue name, device name, and the command to be executed as a slave process for the dequeued data. Remote printing and execution are handled by having slave processes which respool the data into the remote MDQS queues. The mapping table provides the flexibility for multiple devices to process from the same queue or one device to process from multiple queues. If NFS (network file system) or some similar mechanism is used, a single spooling area and daemon with control files can reside on one machine. This eliminates the need for respooling data into remote queues and the overhead of maintaining a local spooling area, daemon, and control files. The remote devices simply process the queue from the remotely mounted file system.

3.2 Security Management

Personal computers can be protected by making the machine physically secure. In a timesharing environment the operating system is used to protect one user from another. In a networked environment there are three approaches to prevent unauthorized access to network services: rely on the host to authenticate the user and then trust the host; require the host to prove its identity and then trust the host as to who the user is; make the user prove who they are for each network service.

3.2.1 Kerberos

"In an open network computing environment, a workstation cannot be trusted to identify its users correctly to network services."⁴ Therefore Kerberos uses the third approach to system security; make the user prove their identity for each network service. In order for a user to prove their identity, they must be authenticated by Kerberos, not the workstation they are using. Passwords are never sent over the network, but are used locally to decrypt the authentication message from Kerberos. To prevent unauthorized use the local workstation destroys the user's password after using it to decrypt the initial Kerberos message.

Once a user has been authenticated they have the keys to request various network services. Different applications can choose different levels of protection. The first is authentication at initiation but subsequent messages are just accepted if from the same network address. The second is where each message is authenticated but the contents of the message are not encrypted. The third level of security is private messages where each message is authenticated and encrypted.

The Kerberos database contains a name, private key, and expiration date for each entity that will use Kerberos services. The master Kerberos database is kept and modified on one machine. Slave servers have read only versions of the database and provide read only types of services. Modification to the master database is accomplished by the administration server (KDBM server). There are two parts to this service: a client which will run on any machine in the network and a server that must run on the machine which houses the master database.

3.3 Accounting Management

Accounting is the recording and reporting of resource usage. This information can then be used to determine appropriate charges for a user.

3.3.1 Harvard Accounting System

This system would track disk usage, cpu time, logins, connect time, printed pages, and budget on an account-by-account basis and charge the appropriate accounts. It was designed to run in a single machine environment.

3.4 Fault Management

In order to restore service after a disk failure a sensible backup procedure needs to have been followed by the administrative staff. Basic commands to move data from one medium to another are described below.

tar and *cpio* file archiving and data interchange formats are the only backup formats specified in 1003.1.

3.4.1 System V Interface Definition (SVID)

3.4.1.1 *volcopy*

The *volcopy* command will make a literal copy of a file system. Copies can be made to another disk location or to tape.

3.4.2 SVID & Berkeley

3.4.2.1 *tar*

The *tar* command is used to create an archive file. Multiple files can be saved to and restored from a single tarfile. The tarfile can reside on various physical media. *tar* will read from standard input and write to standard output so that it can be part of a pipeline. This feature can be used for moving directories.

3.4.2.2 *cpio*

cpio copies a list of files to or from a *cpio* archive file. Pathnames and status information are kept along with the files.

3.4.3 Berkeley *dump* / *rdump* / *restore* / *rrestore*

The *dump* and *rdump* commands will copy all files in a file system to backup media. The *restore* and *rrestore* commands will copy files stored via *dump* to a file system. *rdump* and *rrestore* provide the same functionality as *dump* and *restore* over a network. Remote dump devices are specified as a host-device combination. The *dump* command allows for different levels of backup. A level 0 dump copies every file in the file system. A level 5 dump would copy every file that has been modified since the last dump of a lower level.

3.5 Performance Management

Performance management analyzes the output from system statistics to determine problem areas and develop solutions.

3.5.1 Berkeley Performance Monitoring Commands

The following commands are executable directly on each machine to report local status.

3.5.1.1 *vmstat*

The *vmstat* command provides information on memory usage, process status, and disk utilization.

3.5.1.2 *iostat*

The *iostat* command reports statistics related to I/O operations. Both terminal and disk I/O are included.

3.5.1.3 *netstat*

The *netstat* command displays the contents of network-related data structures. Information is provided about established connections and gateways.

4. Work in Progress

4.1 OSF RFT

The Open Software Foundation will be issuing a Request for Technology (RFT) for System Administration software from the Munich office sometime in August 1989.

4.2 FDDI

A group is forming to determine which variables are appropriate for inclusion in the MIB for FDDI.

4.3 Network Management Language

"NML is seen as a canonical interface between the network management application programmer and the MIXP (Management Information Exchange Protocol)."⁵ It isolates the applications programmer from the specific MIXP being used. Extending this to system administration would enable the underlying protocol to be changed without the system administrator's programming environment to be changed.

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Authors' Addresses

Susanne W. Smith
Windsound Consulting
6225 137th Place SW
Edmonds, WA 98020

smith@usenix.org

John S. Quarterman
TIC
701 Brazos, Suite 500
Austin, TX 78701-3243

jsq@usenix.org

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Report to EUUG and USENIX on ISO JTC1 SC22 WG15 (POSIX) Meeting

May 1-3, 1989

Dominic Dunlop

The Standard Answer Ltd.

Introduction

This is the first of a series of reports which I shall be making on the activities of Working Group 15 of Subcommittee 22 of Technical Committee 1 of the International Standards Organisation (ISO TC1/SC22/WG15). It is this group which is taking the work of the Institute of Electrical and Electronic Engineers (IEEE) on POSIX, a portable operating system interface, from its current official status as an American national standard to its final goal as an international standard. I have been sponsored by the European UNIX systems User Group (EUUG) and USENIX to attend the meetings of the working group on your behalf, representing your views and reporting back on developments which affect your interests.

Meeting Report

Hosted in Ottawa by the Standards Council of Canada, May's three day meeting of ISO TC1 / SC22 / WG15 was attended by five "technical experts" (representatives) from the USA, three from the UK, two from Denmark, and one each from Canada, France, Japan, and the Netherlands. There were three "invited experts": myself, invited by the UK delegation to represent the EUUG and USENIX; Shane McCarron, invited by the USA on behalf of UNIX International; and Mike Lambert of X/Open Company Ltd.

Mike Lambert was invited by Jim Isaak, convener of the working group, to set out X/Open's mission and its position in relation to ISO's activities. It was clear that this was necessary as, in the responses to a previous ballot on the working group's work-in-progress, several respondents effectively asked "Why are we doing this? Doesn't it duplicate the work of X/Open?" What is more, the Comité Européen de Normalisation (CEN - European Committee for Standardisation) is in the

process of voting on a proposal from West Germany that the whole of the *X/Open Portability Guide, Third Edition, 1988* (XPG3) should become a "draft European Prestandard" - one step away from being a European standard.

X/Open's position is clear: "X/Open is not," as the preface to each XPG volume states, "a standards-setting organisation." Instead, X/Open is committed to align itself with international standards as soon as these are agreed, suggesting that its members adhere to other, less formal, national or de-facto standards only when no international standard is in place. In order that national and international standards can be arrived at in a timely manner, X/Open fully endorses the activities of organisations such as the IEEE, ANSI, and ISO, and provides resources to aid in their activities, as it has done - and continues to do - in the case of the IEEE's 1003 (POSIX) developments. Consequently, the Working Group considers that it is inappropriate for an international standards body such as CEN to align itself with the XPG; the XPG is not itself intended to be a formal standard, but rather a series of moving pointers to other standards. As such, it performs a valuable service to industry by indicating areas where more formal standardisation work should take place in the future. Each XPG pointer keeps moving until the area it addresses has become the subject of an agreed international standard. It is unlikely that CEN would tolerate such moving pointers, and would effectively freeze the XPG in its current state.

Another problem is that XPG3 specifies C, COBOL, and FORTRAN - languages covered by other European Standardisation efforts. It also calls out communications protocols, media formats, and a graphics interface (X) which may or may not overlap or conflict with other

standards. It is not clear that these matters were considered before CEN moved to a vote.

Happily, well-defined mechanisms exist for communication between ISO and CEN, and "maximum alignment with ... ISO ... DP9945" is a requirement of the European Community's "order form" to CEN requesting that a POSIX-based European Standard be produced. The working group is using the channels to suggest that DP9945, and, in the near future, the draft IEEE 1003.2 standard, replace XPG3 in their deliberations.

C++ Standardisation

The issue of C++ standardisation was raised in the working group, as there was a (rather vague) feeling that object-oriented facilities are essential for future developments in operating systems, user interfaces, communications systems, and the like. WG15's parent, subcommittee 22, has responsibility for language standardisation. A resolution was drafted recommending that work be started on standardisation of an object-oriented programming language based on C. (The bulk of any such work would probably be given to ANSI, just like the work on C itself.) However, several valid objections resulted in the resolution being dropped:

- It is not clear whether the best basis for such a standard would be AT&T's C++, Stepstone's Objective C, or something else. (The issue is known to excite religious fervour.)
- It is not clear whether or not the language (whatever it is) should be constrained to be a superset of C. Such a constraint would be desirable from the point of view of compatibility, but might compromise the ideological soundness of the language. (Religion again.)
- The business of WG22 is the definition of an operating system interface. It should not concern itself with the means of implementation of an operating system which presents that interface – even if almost everything that conforms to the definition happens to be written in one particular language – C.

All this may seem to be somewhat arcane – distanced from reality. What it boils down to is that WG22 does not think it is time for international standardisation of an object-oriented C derivative. More work needs to be done by industry groupings and national standards bodies – and more users need to vote with their feet – before the terms of reference for an international standard become clear.

A Language-independent Definition of POSIX

The working group discussed the path towards a language-independent definition of POSIX, an issue which took on added urgency because the working group's decision was required in order that the IEEE could determine the initial format of its 1003.4 standard (real-time extensions to 1003.1), which moves to ballot in January, 1990. Like IEEE 1003, WG15 intends that the standards it produces should *ultimately* be expressed in a form which is independent of any particular computer language. And also like 1003, WG22 is currently drafting standards in terms of the C language. Two questions arise: how independent, and how ultimate?

IEEE 1003.1 is working towards removing C-language dependencies from Std. 1003.1-1988, but is stopping short of using a Formal Definition Language (FDL). While this precludes the automatic generation of test procedures, which would be possible were a verifiable FDL used, it is doable in the short term. Soon enough, in fact, to allow 1003.4 to go to ballot in a language independent form. If 1003.1 were to drop its work in favour of a FDL, results would be postponed for some years, and 1003.4 would have to be defined in terms of the C language, much to the distress of the Ada community.

WG22 decided that use of a FDL was most appropriate to an international standard. Consequently, the group had to decide whether it wanted

- a. to ignore 1003.1's work (which could result in 1003.1 dropping the activity);
- b. to recommend that 1003.1 adopt a FDL (with a resultant gross delay); or

- c. to use 1003.1's work as a basis for subsequent WG22 progress towards a formal description of POSIX interfaces.

The last option was chosen, resulting in a resolution which exhorts 1003.1 to keep up the good work. Expect 1003.4 to be language-independent.

For its part, WG22 is going to look into FDLs – a particularly esoteric subject – in more detail at its next meeting in Brussels in October. Ultimately, its standards will have three levels:

1. Formal description (verifiable, but almost incomprehensible to mere mortals);
2. Informal, but computer language-independent, commentary; and
3. Series of language bindings, which may or may not implement the whole interface. (For example, a COBOL binding might well exclude the *fork* interface.)

This should keep us busy well into the 1990s.

Security

ISO, in order to exercise adequate control of activities dispersed both geographically and in time, tries to compartmentalize as much as possible, making sure that the responsibilities of each subcommittee and working group are very well defined. However, there are certain topics which just cannot be pushed into a single compartment: internationalisation is certainly one, affecting as it does almost every aspect of information technology; security – an issue which currently has many people extremely worried – is probably another. Despite this, ISO TC1, having decided that the issue needs an identifiable home, may be convening a new working group – probably WG27 – to handle all aspects of security. (There is much vagueness here: TC1's mailing mechanism appears to have failed, with the result that nobody is sure exactly what will be voted on at its meeting in Paris later in May.)

Of course, this has WG15 worried, both in its own right, and on behalf of other groups and subcommittees affected by issues of security. (Most notable among these is SC18,

which manages the burgeoning ISO protocol stack.) Consequently, a resolution has been forwarded to TC1 via SC22 saying, in effect, "We're in this together. Let's work together." The means of working together is a rapporteur group, a mechanism which exists to allow one group to monitor the activities of another. WG22 has such groups covering verification and internationalization as well as security.

Application Environment Profiles

Jim Isaak, convener of WG22, is much concerned with the issue of *functional standards for applications portability*, or *Application Environment Profiles* (AEPs). Jim chairs IEEE 1003.0, which, in effect, is stocking the shelves of a standards supermarket from which users can pick the selection (or profile) needed to allow applications of a particular type to be realised in a portable manner. (X/Open, The Open Software Foundation, and more than a few governments are doing much the same sort of thing.) One example of such a profile might satisfy the needs of applications requiring distributed database services with reliable transaction processing and high security.

Already, the IEEE has working groups which are defining AEPs: 1003.10 for supercomputing and 1003.11 for transaction processing, and Jim is engaged in selling the idea to ISO. Again, there are two questions: "Are you interested?" and "If so, what profiles do you want to specify?"

It is early yet: the issue is to be raised at Technical Study Group 1's (TSG1's) meeting in Essen, Germany, in September. (TSGs are another ISO mechanism which is brought into play to handle interdisciplinary issues.) TSG1 is developing a framework for application portability, so it should consider AEPs worth adopting. In the meantime, feedback concerning useful and desirable AEPs is solicited by IEEE 1003.0.

Adoption of IEEE's Draft 1003.2 Standard

Finally, WG15 has decided that it is time to adopt IEEE's draft 1003.2 standard, *Shell and Application Utility Interface for Computer Operating System Environments* as the basis for a corresponding international standard. A

little procedural gymnastics is involved: the first SC22 meeting that could authorise such an adoption is in September, and it is not clear which draft of 1003.2 will be current at that time: if things go badly it could be draft 8; if to plan, draft 9. Also, draft international standard 9945, which corresponds to IEEE 1003.1, must be renamed to 9945.1, allowing 1003.2 to form the basis of 9943.2. It took three separate resolutions to put this particular show on the road!

Those, then, are the issues I consider important to members of EUUG and USENIX.

Beyond them, there was much procedural stuff – more, for example, than at an IEEE meeting, even though WG22 is apparently quite informal by ISO standards.

Your comments are welcome; email them to domo@sphinx.co.uk.

Comments Please

We would like to know if you find the previous reports useful. Please send your comments to the editor (ellie@usenix.org).

Summary of the Board of Directors' Meeting Short Hills, NJ, 17-18 April 1989

Attendance

Stephen C. Johnson, Rob Kolstad, Marshall Kirk McKusick, Sharon Murrel, Michael D. O'Dell, Alan G. Nemeth, John S. Quarterman, Deborah K. Scherrer.

Judith F. DesHarnais, John L. Donnelly, Neil P. Groundwater, Ellie Young.

Software Management Workshop Report

Scherrer reported that there were 80 attendees, the technical content of the papers was satisfactory, and the overall evaluation by the attendees was good.

Baltimore Conference

Program. Groundwater stated that 60 submissions were received and 22 papers had been accepted. The ACM has asked to have abstracts of the papers. Quarterman requested that problems with papers appearing elsewhere be relayed to program chairs.

Exhibits. Donnelly discussed his revised projected finances. Kolstad asked for a discussion regarding the future of exhibits – will we sell less booth space. Donnelly stated that sales in Baltimore should match San Francisco, that the vendors think we're important, and that they are concerned about location. Future site discussions should take into account having the site in a more "technical region" of the country.

Tutorials. There are 15 scheduled per day. There was general consensus that the tutorial program is driving the conferences. Student discounts have been instituted and are being advertised.

FaceSaver Proposal

The FaceSaver service proposed for Baltimore would capture new and revised faces to update the UUNET-maintained database, and not produce an attendee list as in the past. There was general agreement that it is a benefit to the membership and draws people into the exhibits. It was agreed to allocate

\$12,500 to the FaceSaver proposal for the Baltimore conference. Passed: 5 in favor, 1 opposed, 2 abstained.

San Diego Report

It was reported that attendance at tutorials was high, and that the conference worked well without UniForum. There was concern that some future sites do not have as much tutorial space. While there were some comments from attendees about the absence of exhibits, there was overall enthusiasm for the box lunches and warm location.

Washington D.C. '90

Scherrer reported that the program committee has been formed. There was a lengthy discussion on how program chairs get their papers, the problems of having quality papers, the time constraints with having full papers vs. extended abstracts, and the Board's role in providing guidelines to chairs. It was agreed that the type of papers needs to be decided beforehand and the chair notified.

A committee was struck to study the problem and make proposals regarding abstracts vs. full papers and report to the Board at the next meeting.

USENIX Room at UniForum in D.C.

Because of the problems with location and cost it was decided that we will not have a USENIX room at the 1990 UniForum in D.C.

Long Range Conferences

1993 Winter Conference. DesHarnais reported on three potential sites. The Board recommended that she pursue San Diego and Disneyland and choose between the two.

1993 Summer Conference. The Board recommended that we sign a contract with Cincinnati.

Future Workshops

O'Dell suggested that we make sure that either a Board member or staff person from the Executive office attend each workshop.

Transaction Processing: Murrel reported that everything was on track, and that she would be attending part of it. Young mentioned

problems with not getting all the papers from the Chair.

Systems Administration III: Kolstad reported that we're trying an experiment by offering two tutorials (by Nemeth and Kolstad) the day before the actual workshop. Standard tutorial rates will apply and he estimated that 50 people may attend each.

Distributed Systems: Kolstad reported that the paperwork from the other sponsors would be forthcoming. The co-chairs are very active and seem to have things well under control.

C++ '90: Jim Waldo of Apollo has accepted the chair.

Since there were very few responses to the posting on the net for future workshop topics, it was agreed that individual Board members should actively search for future topics.

Quarterman and Kolstad will look into a joint workshop with EUUG on Systems Administration.

Future Conference Chairs

McKusick was asked to invite Allman to be the '92 San Francisco chair; Johnson was asked to contact Mashey about his plans for Anaheim in '90; Quarterman was asked to offer Grob / Shore Dallas in '91; O'Dell was asked to offer Adams San Antonio in '92; Scherrer was offered (and she accepted) Nashville '91.

The following appointments for Board liaisons were made:

Anaheim '90	Johnson
Dallas '91	Quarterman
Nashville '91	Nemeth
San Francisco '92	McKusick
San Antonio '92	O'Dell

Alix Vasilatos was appointed Informal Programming Chair for Baltimore.

Database Report and Conference Office's Machine

O'Dell reported on the committee's meeting in Berkeley, where a dataflow model for all three offices was discussed. O'Dell said there are two problems – the long term problem of the database and the short term one of the

conference office's machine. It was decided to deal with the latter immediately and to authorize \$30,000 for a machine for the conference office and that the database committee authorize these expenditures.

Executive Director

It was moved that Ellie Young be appointed Executive Director. Passed unanimously.

High School Computing Funding

It was approved unanimously to authorize \$3,000 to fund Don Piele's International Computer Problem Solving Contest.

Standards

Quarterman reported on the negotiations in Brussels between USENIX and EUUG regarding a joint representative to the ISO Working Group 15 POSIX committee. The two groups have hired Dominic Dunlop to be the representative. Quarterman was thanked by the Board. He also reported that USENIX is coordinating a White Paper on system administration for IEEE 1003.7, a new standards committee in this area.

Quarterman announced that McCarron would not be able to edit USENIX Standards Watchdog committee reports. There was discussion about making these reports into another publication. The Board, however, agreed that we should continue to publish these reports in :login: and that Quarterman should hire someone else to do the reports.

Legal Business

In a letter from our attorney Dan Appelman, the Board was advised to amend the corporation's Certificate of Incorporation to limit the personal liability of its directors, and the Board did so.

UUNET Report

O'Dell had an updated version of UUNET's finances. He reported that they have secured a line of credit, moved into new offices, and Rick Adams is now working full time as UUNET's technical director.

Relationship with EUUG and European National Groups

Murrel, as the USENIX representative at the EUUG meeting in Brussels, gave a report.

EUUG-Publications. Murrel expressed EUUG's concern about the financial arrangement with USENIX for publications and the confusion about the initial arrangements. Young was instructed to work with EUUG on this and that future sales of publications would be coordinated with Philip Peake of the EUUG.

Relationship with EUUG and the European National Groups. Murrel reported that while EUUG encourages all informal contacts between user groups, they would like to be the sole contact for EUUG and their national group members for negotiations leading to reciprocal agreements and purchases of services. There was general agreement that such a policy would be impossible since any USENIX member can order any quantity of our publications.

Nemeth and Johnson suggested an exchange of publications with JUS so that we can abstract and index them.

Proposal for Second UNIX on Supercomputers Workshop

Lori Grob's proposal that USENIX sponsor a second UNIX on Supercomputers workshop in early Fall of 1990 was approved.

Publications and Membership

Manuals. Young reported that while customer service from Howard Press has been poor in the past, she had met with them to relay our concerns as well as to check the inventory. It was recommended that we advertise the manuals as "final printing" and push their sales at the conferences.

Reprinting Proceedings. Young reported that after three postings on the net, the number of responses was still too little to warrant reprinting. We will offer out-of-print proceedings at our cost to reproduce them on a per request basis.

Executive Office Report. Young went over the report. Total membership as of 4/1/89 was

2,712, up 30% from figures of the previous year.

Budget

There was a discussion regarding future costs for the journal. Young reported that the contract with UC Press calls for fees to be somewhat lower over the next two years, and with more library subscriptions our fees would be reduced even further.

The Board was satisfied with Young's efforts to provide a cash flow model for all three offices. There were some format suggestions for the reporting of membership services, and suggestions for other models to enable the Board to plan for future growth, projects, and have a better understanding of what has happened in the past.

It was decided to pay off the First Interstate Bank loan for the Sequent machine and make arrangements with UUNET for a schedule of payments.

Membership Fees / Dues Proposal

There was discussion regarding Young's proposal sheets. The general feeling of the Board was that the Association can continue to depend on the conference surplus to fund membership benefits. It was passed unanimously that the 1990 membership dues remain:

Student:	\$15
Individual:	\$40
Educational:	\$125
Corporate:	\$275
Supporting:	\$1,000

It was also approved that a subscription to the proceedings be included as a benefit to all institutional members as soon as possible.

Election Subcommittee Proposal

Murrel, speaking for the election subcommittee, proposed a Bylaw change to limit the number of consecutive terms for board members. The following wording change to the Bylaws was approved:

Replace in section 4.2:

Any eligible person may be reelected as an officer or director one or more times.

with

Any eligible person may be reelected as an officer or director one or more times, but may not be elected to more than four terms in succession.

And that this Bylaw change will take effect after the next election, on July 1, 1990.

-EY

UUNET Source Archives on Tape

By popular demand, UUNET Communications Services is making its collection of freely redistributable UNIX source archives available on tape to any interested parties.

UUNET has over 500 megabytes of source archives on line for UUNET subscribers to access. These archives are now available to anyone. They are distributed on two 6250 bpi $\frac{1}{2}$ " tapes or FIVE $\frac{1}{4}$ " cartridge tapes (QIC-24, Archive 60 megabyte tapes, *i.e.*, Sun compatible). All files on the tape are compressed (except the *compress* program itself) to save space. The all inclusive cost of these tapes with prepayment is \$200 for the $\frac{1}{2}$ " tapes or \$350 for the $\frac{1}{4}$ " tapes. If you require us to process a purchase order or to invoice you, add \$50 for processing costs (*i.e.*, \$250 for the $\frac{1}{2}$ " tapes or \$400 for the $\frac{1}{4}$ " tapes).

All sources are the latest available versions at the time the tape is written. Included on the tape are the MIT X Window System, Version 11 Release 3 plus fixes and lots of contributed software (110 megabytes); the complete *comp.sources.unix* archive (56 megabytes); the T_EX text processing system (46 megabytes); all available GNU software (35 megabytes); the complete *comp.sources.games* archive (20 megabytes); the freely redistributable software from the 4.3BSD-Tahoe & Networking releases of Berkeley UNIX (17 megabytes); various networking related programs (30 megabytes); all the Internet RFCs (10 megabytes); the USENIX *Facesaver* data (60 megabytes); the *comp.std.unix* standards archives (10 megabytes); and lots more.

To obtain the tape distribution or for further information contact:

UUNET Communications Services
3110 Fairview Park Drive, Suite 570
Falls Church, VA 22042

+1 703 876 5050 (voice)
+1 703 876 5059 (fax)
uunet@uunet.uu.net

USENIX Software Distribution Tape

The 1989 USENIX software tape (the final USENIX source distribution) contains software collected for USENIX by Plus Five of St. Louis. It has just been mailed to all institutional and supporting members of the Association. The tape is in *tar* format at 6250 bpi.

Individual members of USENIX who wish to obtain a copy of the tape may request it from the Association office. The price is \$60 (includes domestic postage, foreign individuals will be billed for the additional postage). It requires no AT&T nor UC license. You will be sent a requestor "Tape Release Form" which should be returned to the Association. Check, purchase orders, or payment by VISA/MC are accepted. (For charge orders please include card number, expiration date, and your signature.) Please allow 2 weeks for receipt of your order.

Scholarship Winner

The Association is pleased to announce that James N. Griffioen is the recipient of the 1989-90 USENIX Scholarship. Griffioen is a Ph.D. student studying virtual memory operating systems at Purdue University.

Executive Office Staff

Andrea Galleni has been hired as the administrative assistant for the Executive office. Andrea has been working part time for the Association during the past six months and many of you have met her at our past two conferences. She will assist the executive director in bookkeeping, publications, and the in the day-to-day business of running the Berkeley office.

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Local User Groups

The Association will support local user groups by doing an initial mailing to assist the formation of a new group and publishing information on local groups in *:login:*. At least one member of the group must be a current member of the Association. Send additions and corrections to *usenix@login.*

CA - Fresno: the Central California UNIX Users Group consists of a *uucp*-based electronic mailing list to which members may post questions or information. For connection information:

Educational and governmental institutions:

Brent Auernheimer (209) 294-4373
brent@CSUFresno.edu or *csufres!brent*

Commercial institutions or individuals:

Gordon Crumal (209) 875-8755
csufres!gordon (209) 298-8393

CA - Los Angeles: the Los Angeles UNIX Group meets on the 3rd Thursday of each month in Redondo Beach.

Drew Bullard (213) 535-1980
ucbvax!trwrb!bullard

Marc Ries (213) 535-1980
{i}devcavx,scdrdcf{!trwrb!ries}

CO - Boulder: the Front Range UNIX Users Group meets monthly at different sites.

Steve Gaede (303) 938-2985
NBI, Inc.
P.O. Box 9001
Boulder, CO 80301
{i}boulder,hao{!nbires!gaede}

FL - Coral Springs:

S. Shaw McQuinn (305) 344-8686
8557 W. Sample Road
Coral Springs, FL 33065

FL - Jacksonville/Northeast: UNIX Users of Jacksonville (*uujax*) meets the 2nd Thursday of each month.

Tom Blakely (904) 646-2820
uflorida!unf7!tfb
Emilie Olsen (904) 390-3621

FL - Melbourne: the Space Coast UNIX Users Group meets at 8pm on the 3rd Wednesday of each month at the Florida Institute of Technology.

Bill Davis (407) 242-4449
bill@ccd.harris.com

FL - Orlando: the Central Florida UNIX Users Group meets the 3rd Thursday of each month.

Mike Geldner (305) 862-0949
codas!sunfla!mike

Ben Goldfarb (305) 275-2790
goldfarb@hcx9.ucf.edu

Mikel Manitius (305) 869-2462
{i}codas.attmail{!mikel

FL - Tampa Bay: the Tampa UNIX Users Group meets the 1st Thursday of each month in Largo.

Bill Hargen (813) 530-8655
uunet!pdn!hargen

George W. Leach (813) 530-2376
uunet!pdn!reggie

GA - Atlanta: meets on the 1st Monday of each month in White Hall, Emory University.

Atlanta UNIX Users Group
P.O. Box 12241
Atlanta, GA 30355-2241

Marc Merlin (404) 442-4772
Mark Landry (404) 365-8108

MI - Detroit/Ann Arbor: The SouthEastern Michigan Sun Local Users Group meets jointly with the Nameless UNIX Group on the 2nd Thursday of each month in Ann Arbor.

Steve Simmons home: (313) 426-8981
scs@lokkur.dexter.mi.us office: (313) 769-4086

K. Richard McGill
rich@sendai.ann-arbor.mi.us

Bill Bulley
web@applga.uucp

MI - Detroit/Ann Arbor: dinner meetings the 1st Wednesday of each month.

Linda Mason (313) 855-4220
michigan!usr/group
P.O. Box 189602
Farmington Hills, MI 48018-9602

:login: 14:4

MN - Minneapolis/St. Paul: meets the 1st Wednesday of each month.

UNIX Users of Minnesota
17130 Jordan Court
Lakeville, MN 55044

Robert A. Monio (612) 895-7007
pnessutt@nis.mn.org

MO - St. Louis:

St. Louis UNIX Users Group
Plus Five Computer Services
765 Westwood, 10A
Clayton, MO 63105

Eric Kiebler (314) 725-9492
plus5!sluug

NE - Omaha: meets on the 2nd Thursday of each month.

/usr/group nebraska
P.O. Box 44112
Omaha, NE 68144

Kent Landfield (402) 291-8300
kent@ugn.uucp

New England - Northern: meets monthly at different sites.

Emily Bryant (603) 646-2999
Kiewit Computation Center
Dartmouth College
Hanover, NH 03755

David Marston (603) 883-3556
Daniel Webster College
University Drive
Nashua, NH 03063

decvax!dartvax!nneuug-contact

NJ - Princeton: the Princeton UNIX Users Group meets monthly.

Pat Parseghian (609) 452-6261
Dept. of Computer Science
Princeton University
Princeton, NJ 08544
pep@Princeton.EDU

NY - New York City:

Unigroup of New York
G.P.O. Box 1931
New York, NY 10116

Ed Taylor (212) 513-7777
{attunix,philabs}!pencom!taylor

New Zealand:

New Zealand UNIX Systems User Group
P.O. Box 13056
University of Waikato
Hamilton, New Zealand

OK - Tulsa:

Pete Rourke
\$USR
7340 East 25th Place
Tulsa, OK 74129

PA - Philadelphia: the UNIX SIG of the Philadelphia Area Computer Society (PACS) meets the morning of the 3rd Saturday of each month at the Holroyd Science Building, LaSalle University.

G. Baun, UNIX SIG
c/o PACS
Box 312
La Salle University
Philadelphia, PA 19141

rutgers!{bpa,cbmvax}!
temvax!pacsbb!{gbaum,whutchi}

TX - Dallas/Fort Worth:

Dallas/Fort Worth UNIX Users Group
Seny Systems, Inc.
5327 N. Central, #320
Dallas, TX 75205

Jim Hummel (214) 522-2324

TX - San Antonio: the San Antonio UNIX Users (SATUU) meets the 3rd Thursday of each month.

Jeff Mason (512) 494-9336
Hewlett Packard
14100 San Pedro
San Antonio, TX 78232
gatech!petro!hpsatb!jeff

WA - Seattle: meets monthly.

Bill Campbell (206) 232-4164
Seattle UNIX Group Membership Information
6641 East Mercer Way
Mercer Island, WA 98040

uw-beaver!tikal!camco!bill

Washington, D.C.: meets the 1st Tuesday of each month.

Washington Area UNIX Users Group
2070 Chain Bridge Road, Suite 333
Vienna, VA 22180

Samuel Samalin (703) 448-1908

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